Hh-Npp binds BOC:PTCH1

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Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

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Literature references

Fabregat, A., Sidiropoulos, K., Viteri, G., Forner, O., Marin-Garcia, P., Arnau, V. et al. (2017). Reactome pathway analysis: a high-performance in-memory approach. *BMC bioinformatics, 18*, 142. ↗

Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics, 33*, 3461-3467. ↗

Fabregat, A., Jupe, S., Matthews, L., Sidiropoulos, K., Gillespie, M., Garapati, P. et al. (2018). The Reactome Pathway Knowledgebase. *Nucleic Acids Res, 46*, D649-D655. ↗

Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology, 14*, e1005968. ↗

Reactome database release: 88
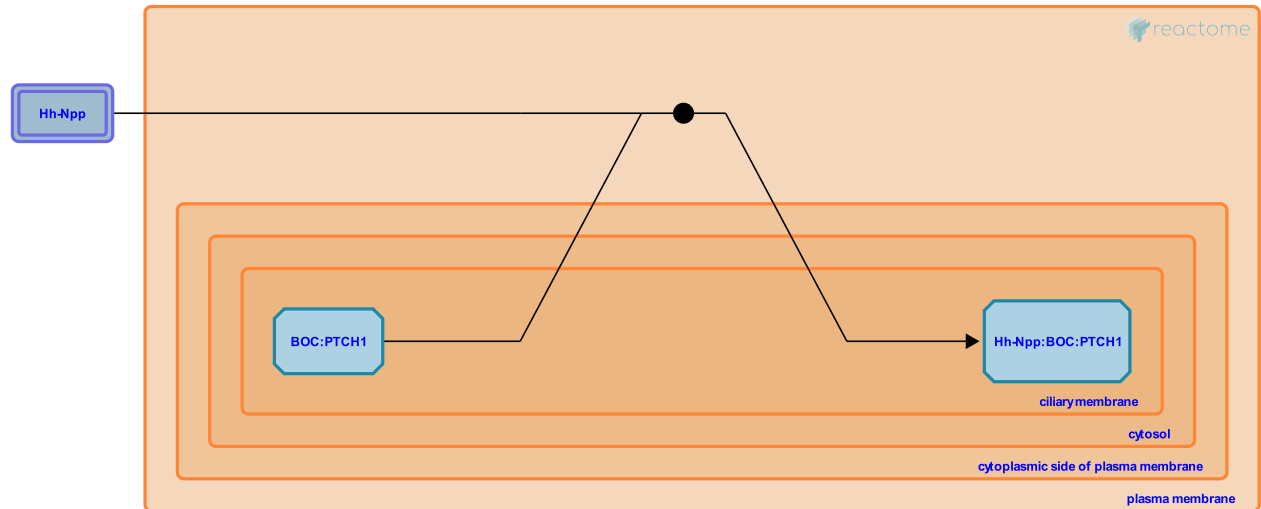
This document contains 1 reaction (see Table of Contents)

Hh-Npp binds BOC:PTCH1 ↗

Stable identifier: R-HSA-5632653

Type: binding

Compartments: plasma membrane

Inferred from: Shh binds Boc:Ptch1 (Mus musculus)

Hh pathway activation depends upon the binding of Hh ligand to the PTCH transmembrane receptor (Chen and Struhl, 1996; Marigo et al, 1996; Stone et al, 1996). Ligand binding relieves the PTCH-dependent inhibition of SMO, allowing SMO to concentrate in the primary cilium and promoting the accumulation of the full-length form of the GLI transcriptional proteins (reviewed in Briscoe and Therond, 2013). PTCH also binds constitutively to the transmembrane protein BOC (brother of CDO), one of three vertebrate co-receptors required for Hh signaling in mice (Izzi et al, 2011; Allen et al, 2011; reviewed in Sanchez-Arrones et al, 2012). BOC interacts with PTCH through the first and second of the BOC fibronectin type 3 (FNIII) repeats, and with SHH through the third FNIII repeat, suggesting the formation of a ternary complex in the presence of ligand (Okada et al, 2006; Izzi et al, 2011). Although GAS1 similarly binds to both PTCH and Hh, it is not co-immunoprecipitated with BOC, suggesting the formation of separate receptor:co-receptor complexes (Izzi et al, 2011; Allen et al, 2011; reviewed in Briscoe and Therond, 2013).

Literature references

Stone, DM., de Sauvage, F., Hooper, JE., Gu, Q., Pennica, D., Goddard, A. et al. (1996). The tumour-suppressor gene patched encodes a candidate receptor for Sonic hedgehog. *Nature, 384*, 129-34. ↗

Chen, Y., Struhl, G. (1996). Dual roles for patched in sequestering and transducing Hedgehog. *Cell, 87*, 553-63. ↗

Davey, RA., Cunningham, JM., Marigo, V., Zuo, Y., Tabin, CJ. (1996). Biochemical evidence that patched is the Hedgehog receptor. *Nature, 384*, 176-9. ↗

Charron, F., Morin, S., Krauss, RS., Allen, BL., Laniel, D., Lévesque, M. et al. (2011). Boc and Gas1 each form distinct Shh receptor complexes with Ptch1 and are required for Shh-mediated cell proliferation. *Dev. Cell, 20*, 788-801. ↗

Charron, F., Fabre, PJ., Morin, S., Okada, A., Wong, K., McConnell, SK. et al. (2006). Boc is a receptor for sonic hedgehog in the guidance of commissural axons. *Nature, 444*, 369-73. ↗

Editions

2014-10-20	Authored	Rothfels, K.
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